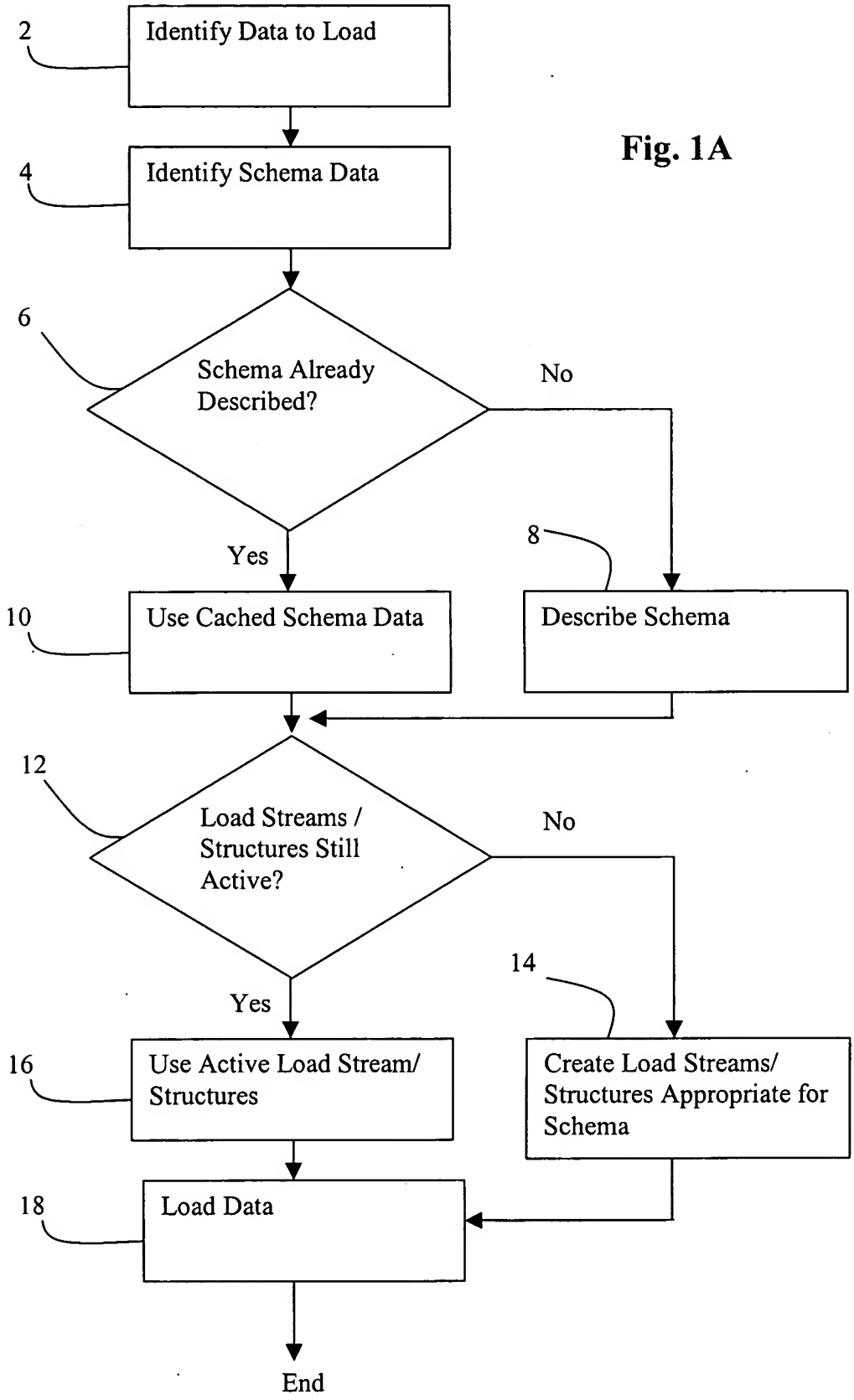

2
Identify Data to Load
4
Identify Schema Data
6
Schema Already Described?
No
Yes
8
Describe Schema
10
Use Cached Schema Data
12
Load Streams / Structures Still Active?
No
Yes
14
Create Load Streams/ Structures Appropriate for Schema
16
Use Active Load Stream/ Structures
18
Load Data
End

Fig. 1A

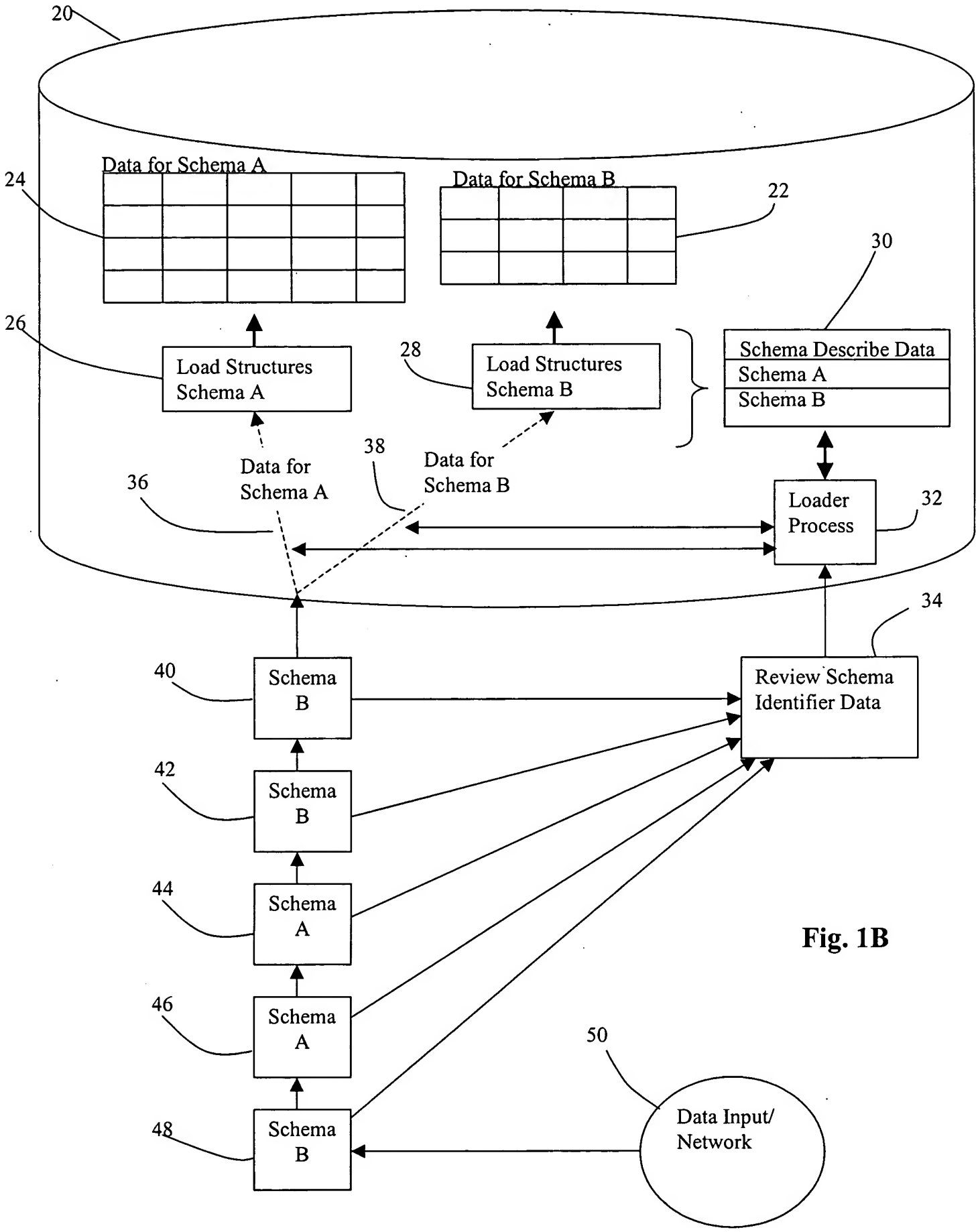

20
Data for Schema A
24
Data for Schema B
22
30
26
Load Structures Schema A
28
Load Structures Schema B
Schema Describe Data
Schema A
Schema B
38
Data for Schema A
Data for Schema B
36
Loader Process
32
34
40
Schema B
Review Schema Identifier Data
42
Schema B
44
Schema A
46
Schema A
50
48
Schema B
Data Input/ Network

Fig. 1B

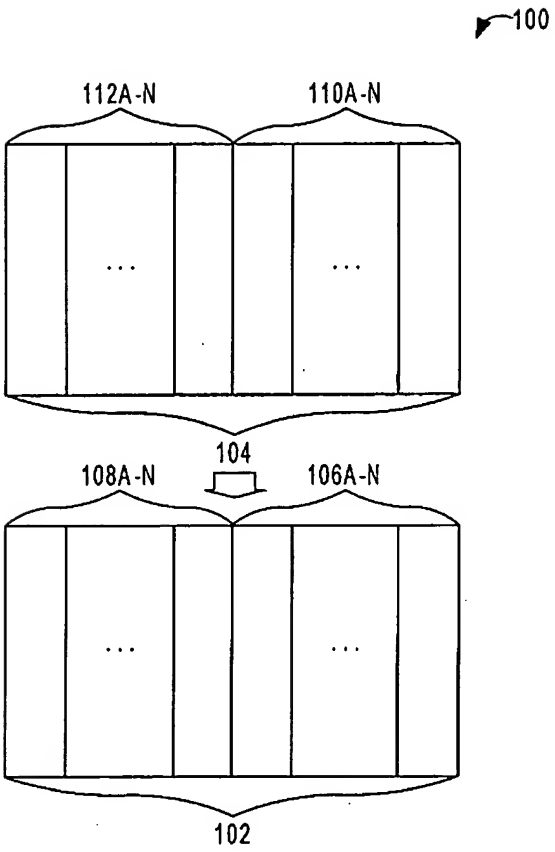


FIG. 1C

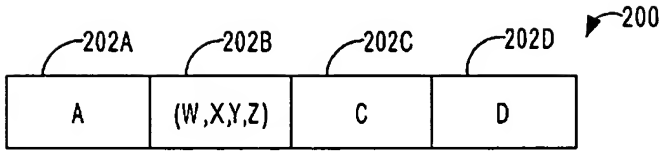


FIG. 2

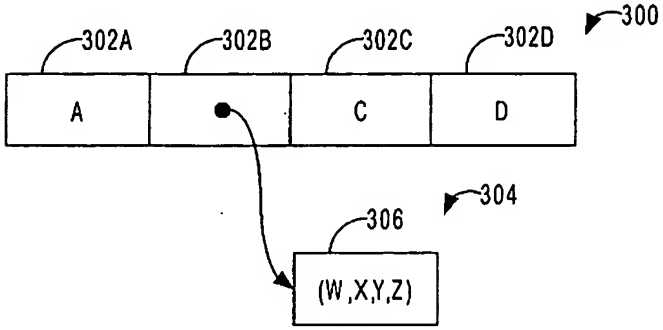


FIG. 3

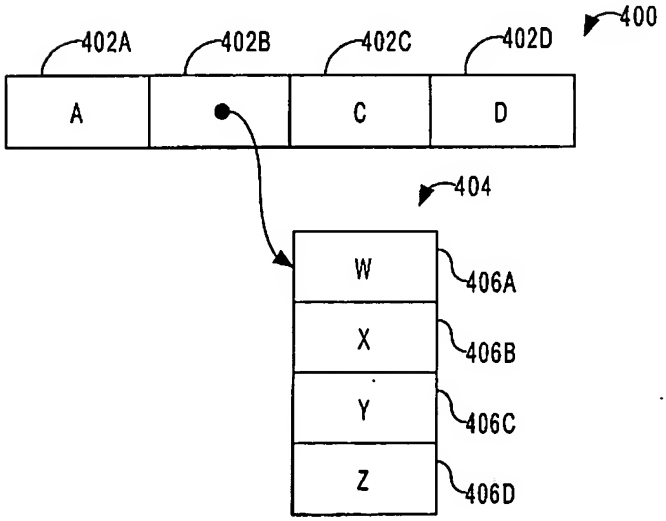


FIG. 4A

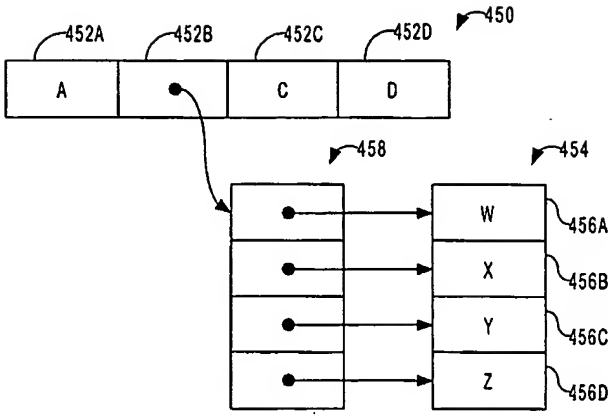


FIG.4B

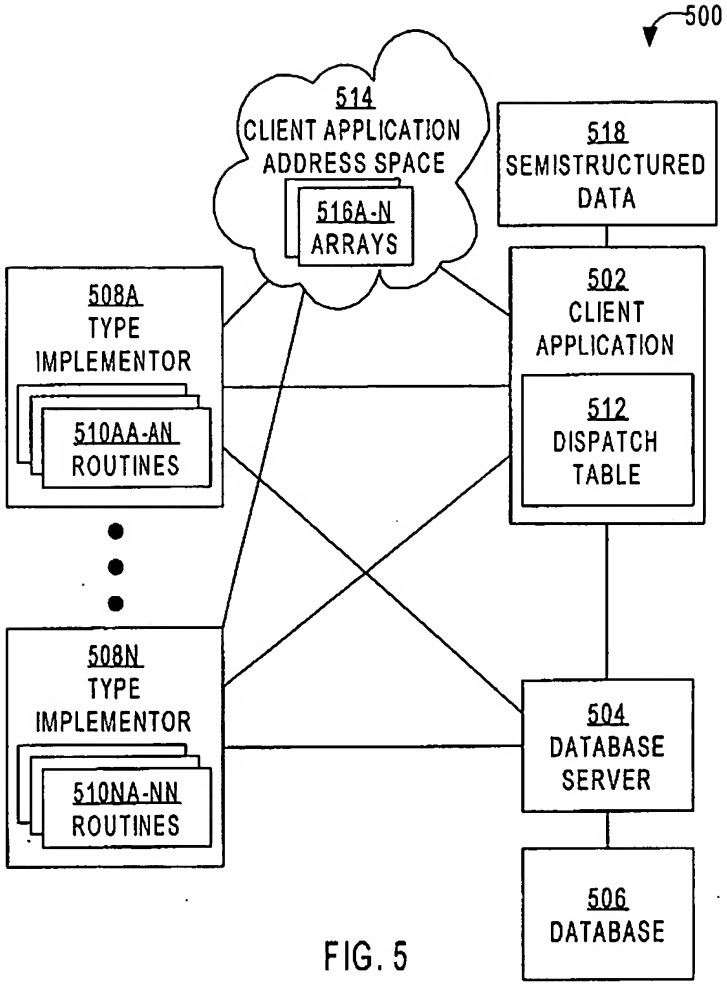

500
514
CLIENT APPLICATION ADDRESS SPACE
516A-N
ARRAYS
518
SEMISTRUCTURED DATA
502
CLIENT APPLICATION
512
DISPATCH TABLE
508A
TYPE IMPLEMENTOR
510AA-AN
ROUTINES
508N
TYPE IMPLEMENTOR
510NA-NN
ROUTINES
504
DATABASE SERVER
506
DATABASE

FIG. 5

FIG.6A

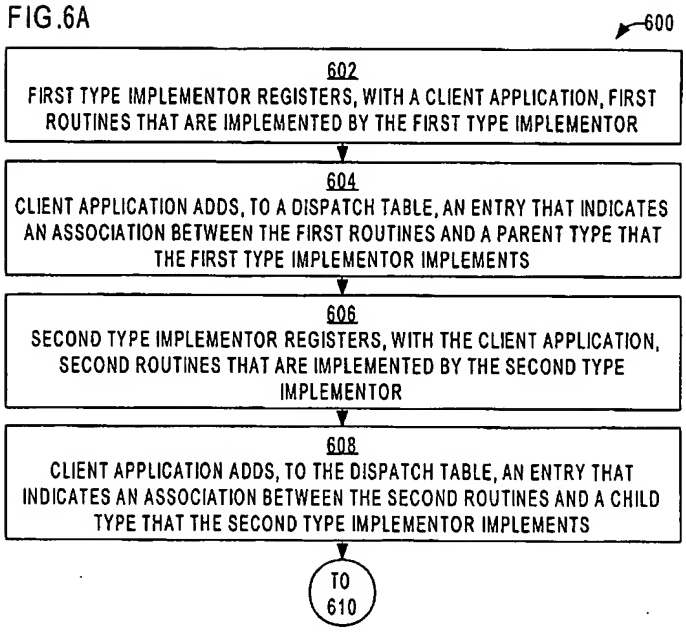

600
602
FIRST TYPE IMPLEMENTOR REGISTERS, WITH A CLIENT APPLICATION, FIRST ROUTINES THAT ARE IMPLEMENTED BY THE FIRST TYPE IMPLEMENTOR
604
CLIENT APPLICATION ADDS, TO A DISPATCH TABLE, AN ENTRY THAT INDICATES AN ASSOCIATION BETWEEN THE FIRST ROUTINES AND A PARENT TYPE THAT THE FIRST TYPE IMPLEMENTOR IMPLEMENTS
606
SECOND TYPE IMPLEMENTOR REGISTERS, WITH THE CLIENT APPLICATION, SECOND ROUTINES THAT ARE IMPLEMENTED BY THE SECOND TYPE IMPLEMENTOR
608
CLIENT APPLICATION ADDS, TO THE DISPATCH TABLE, AN ENTRY THAT INDICATES AN ASSOCIATION BETWEEN THE SECOND ROUTINES AND A CHILD TYPE THAT THE SECOND TYPE IMPLEMENTOR IMPLEMENTS
TO 610

FIG.6B

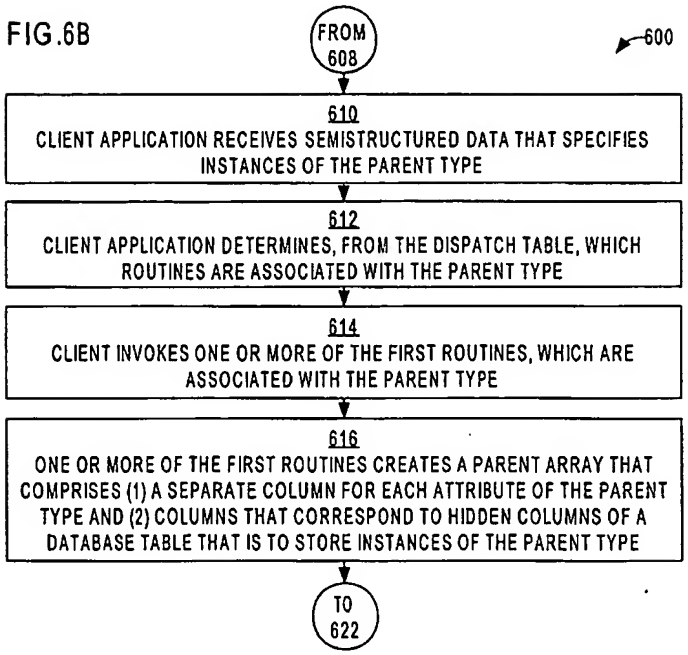

FROM 608
600
610
CLIENT APPLICATION RECEIVES SEMISTRUCTURED DATA THAT SPECIFIES INSTANCES OF THE PARENT TYPE
612
CLIENT APPLICATION DETERMINES, FROM THE DISPATCH TABLE, WHICH ROUTINES ARE ASSOCIATED WITH THE PARENT TYPE
614
CLIENT INVOKES ONE OR MORE OF THE FIRST ROUTINES, WHICH ARE ASSOCIATED WITH THE PARENT TYPE
616
ONE OR MORE OF THE FIRST ROUTINES CREATES A PARENT ARRAY THAT COMPRISES (1) A SEPARATE COLUMN FOR EACH ATTRIBUTE OF THE PARENT TYPE AND (2) COLUMNS THAT CORRESPOND TO HIDDEN COLUMNS OF A DATABASE TABLE THAT IS TO STORE INSTANCES OF THE PARENT TYPE
TO 622

FIG.6C

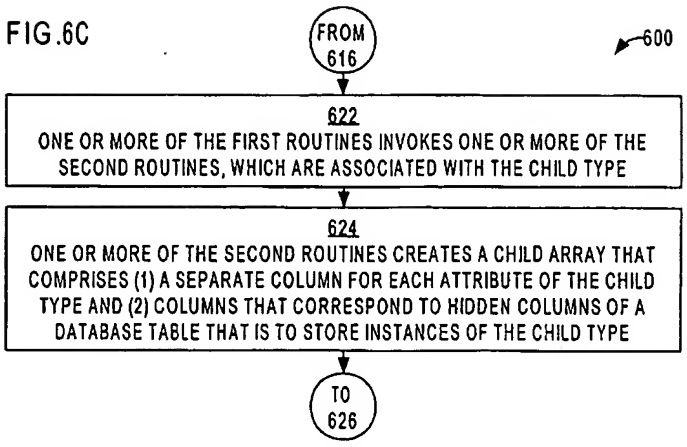
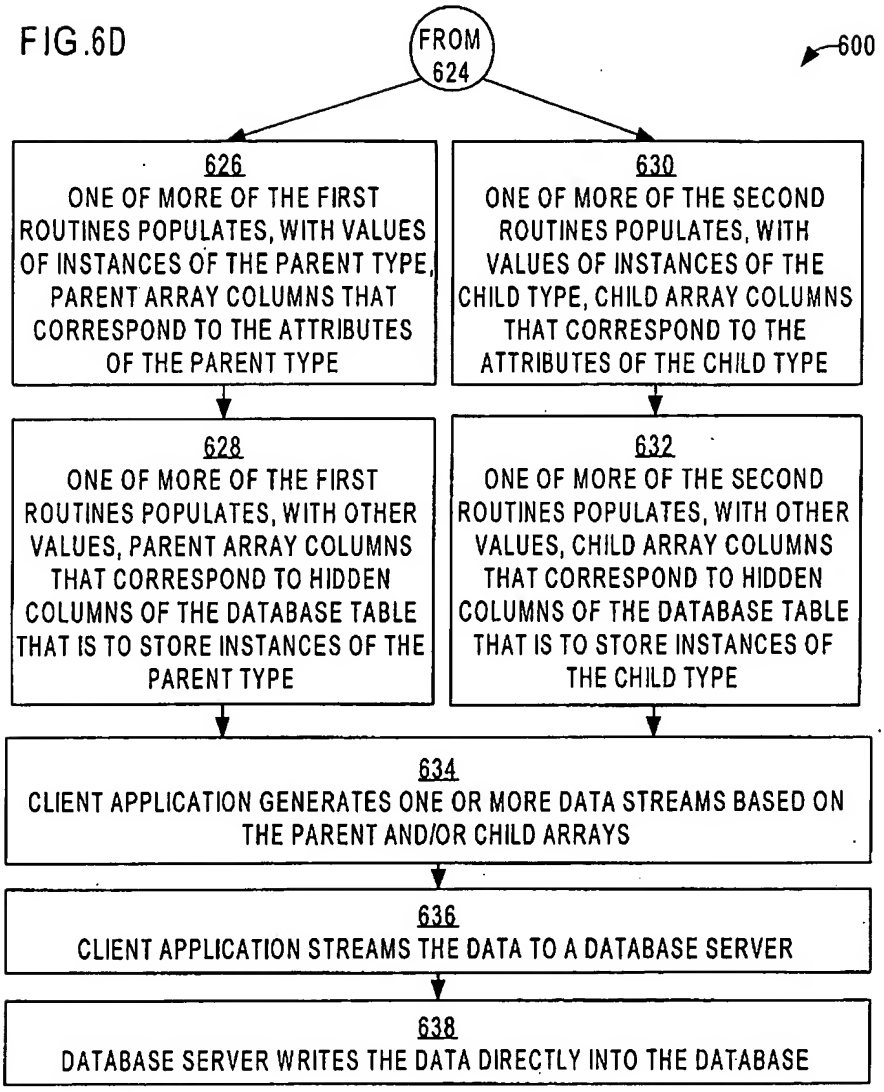

FROM 616
600
622
ONE OR MORE OF THE FIRST ROUTINES INVOKES ONE OR MORE OF THE SECOND ROUTINES, WHICH ARE ASSOCIATED WITH THE CHILD TYPE
624
ONE OR MORE OF THE SECOND ROUTINES CREATES A CHILD ARRAY THAT COMPRISES (1) A SEPARATE COLUMN FOR EACH ATTRIBUTE OF THE CHILD TYPE AND (2) COLUMNS THAT CORRESPOND TO HIDDEN COLUMNS OF A DATABASE TABLE THAT IS TO STORE INSTANCES OF THE CHILD TYPE
TO 626

FIG.6D


FROM 624
600
626
ONE OF MORE OF THE FIRST ROUTINES POPULATES, WITH VALUES OF INSTANCES OF THE PARENT TYPE, PARENT ARRAY COLUMNS THAT CORRESPOND TO THE ATTRIBUTES OF THE PARENT TYPE
630
ONE OF MORE OF THE SECOND ROUTINES POPULATES, WITH VALUES OF INSTANCES OF THE CHILD TYPE, CHILD ARRAY COLUMNS THAT CORRESPOND TO THE ATTRIBUTES OF THE CHILD TYPE
628
ONE OF MORE OF THE FIRST ROUTINES POPULATES, WITH OTHER VALUES, PARENT ARRAY COLUMNS THAT CORRESPOND TO HIDDEN COLUMNS OF THE DATABASE TABLE THAT IS TO STORE INSTANCES OF THE PARENT TYPE
632
ONE OF MORE OF THE SECOND ROUTINES POPULATES, WITH OTHER VALUES, CHILD ARRAY COLUMNS THAT CORRESPOND TO HIDDEN COLUMNS OF THE DATABASE TABLE THAT IS TO STORE INSTANCES OF THE CHILD TYPE
634
CLIENT APPLICATION GENERATES ONE OR MORE DATA STREAMS BASED ON THE PARENT AND/OR CHILD ARRAYS
636
CLIENT APPLICATION STREAMS THE DATA TO A DATABASE SERVER
638
DATABASE SERVER WRITES THE DATA DIRECTLY INTO THE DATABASE

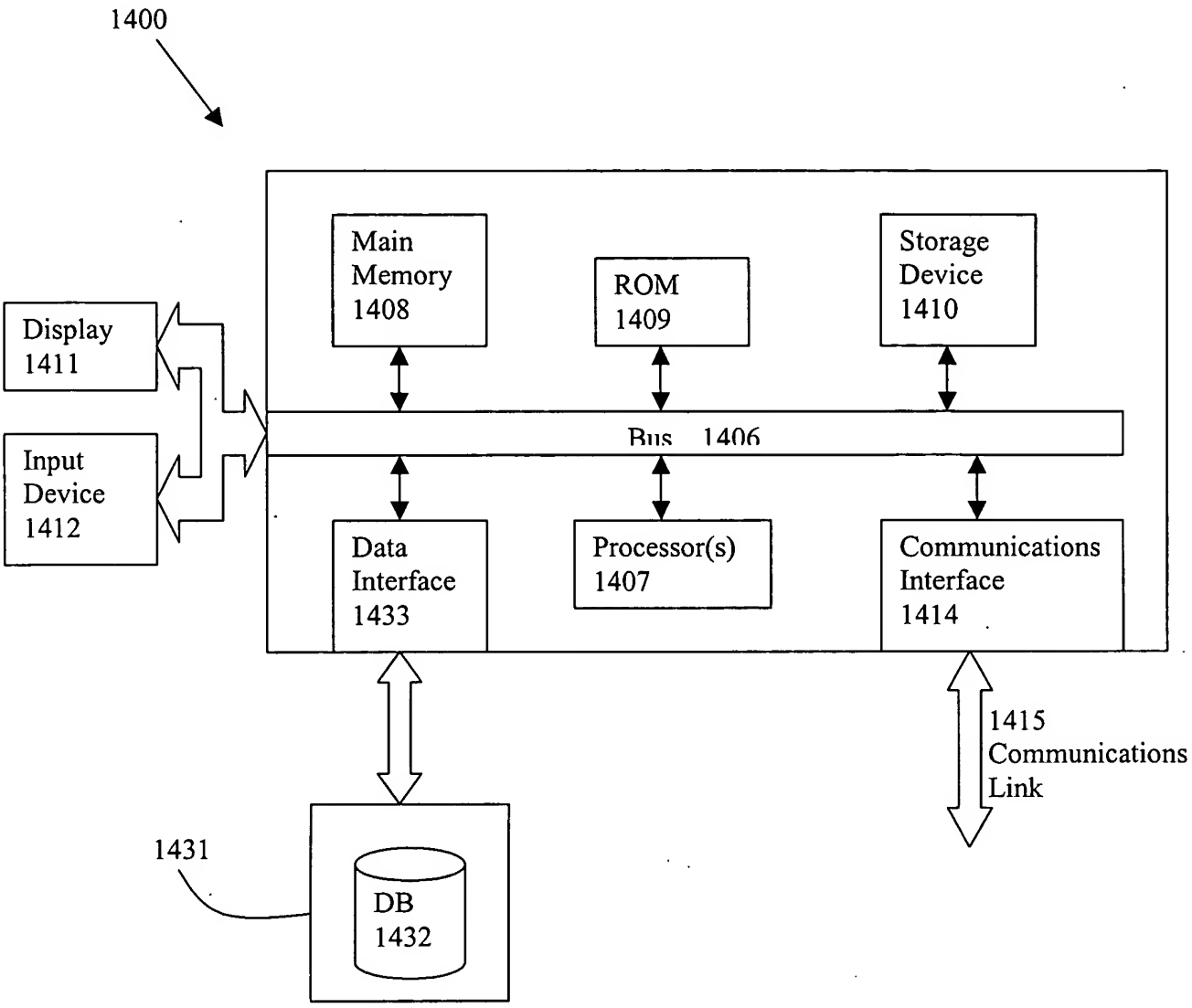

1400
Main Memory 1408
ROM 1409
Storage Device 1410
Display 1411
Input Device 1412
Bus 1406
Data Interface 1433
Processor(s) 1407
Communications Interface 1414
1415 Communications Link
1431
DB 1432

Fig. 7